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Executive Summary

Int@j, the Information Technology Association of Jordan, held a seminar on Open Source Software (OSS) in December 2002. Since then, the OSS field in Jordan and the Middle East region has developed, but there are still numerous opportunities for economic growth in this area. Int@j hosted another seminar on OSS in July 2005. This paper reviews the seminar proceedings, after first introducing OSS and its use in various international settings. The seminar's contents are presented across four themes: business opportunities in OSS, the open source community and philosophy, development opportunities in Jordan and the Middle East region, and challenges of OSS. The paper concludes with recommendations for achieving continued growth through OSS.

1. Introduction

The AMIR program's Information and Communication Technology Initiative (ICTI) supports Jordan's effort to develop as an IT hub for the region. This work is conducted through several initiatives, including e-government projects, technical assistance on telecommunications policy and regulations, and IT industry development. Since 1998, the AMIR program has been providing support in the form of financial and technical assistance to the Information Technology Association of Jordan, int@j. The goal of int@j, a voluntary, private and non-profit organization, is to promote and advance Jordan's software and IT industry in the global market. The association supports human resource development in the field by establishing linkages with universities, disseminating market information and research, promoting standardization of the industry, and advocating for Jordan's IT industry with the government and international organizations.

2. Background Information

2.1 Open Source Software Defined

Most software is proprietary and closed source. The licenses for such software prohibit users from copying or sharing it and are often expensive to acquire and maintain. Conversely, open source software (OSS) is defined as any computer program for which the source code is available to the general public for view, use and modification. Open source code is generally developed in a collaborative fashion, with independent programmers contributing to and improving upon the software. The Linux operating system and Apache web server are among the most common OSS tools in use today.

While ninety percent of the world's computers operate on the Microsoft Windows system, OSS is becoming increasingly popular option, especially in the public sector. As of December 2004, over one-hundred regional, local, and national governments had considered policies or legislation encouraging or mandating the use of OSS, and twenty-four had proposed legislation or policies mandating the use of OSS (CSIS 2004). These proposals were driven by a number of factors, including dissatisfaction with American dominance of the software industry and a desire to encourage indigenous software development (CSIS 2004). Publicly-funded groups, such as the IDABC (the European Commission's Interoperable Delivery of e-Government Services to Administrations, Business and Citizens), offer ideological reasons for the use of OSS, including the promotion of freedom and equality and "digital endurance" (IDABC 2005). int@j states that OSS can help create more equitable societies by making technological benefits available to a wider population (int@j 2002). Practical advantage of OSS include: an increased level of security, as weaknesses are more likely to be caught and fixed when source code is viewed by a number of programmers; and reduced potential for market manipulation by large software companies that can force increases for upgrades.

, despite stated ideological preferences for OSS, its use is rarely mandated in the public sector. For example, of the legislation mentioned earlier that made it to the proposal stage, few have been implemented, and the use of proprietary software has never been banned. For the most part, actual acquisition decisions are generally based on cost and performance considerations, rather than ideological preferences (CSIS 2004, 1). In this respect, OSS also may offer a distinct advantage. While open source code is freely available for viewing, it is not free of charge. However, purchasing OSS is often considerably less expensive than procuring licenses for proprietary software. Most organizations and entities switching to OSS cite cost savings as the primary reason for changing.

2.1 International Experience with OSS

OSS has been used and promoted to various degrees throughout the world. In Europe, the proliferation of OSS was initiated largely in the public sector. IDA, which serves as a clearinghouse for information on OSS use and best practices in Europe, details the adoption of OSS in a variety of settings. For example, the German Bundeskartellamt (the Federal Cartel Office) adopted OSS for its operating system, databases, and content management systems. In addition to cost savings, the German government wanted to ensure their digital security after September 11th, and reduce the number of servers the offices used. While the switch created a few difficulties, the project was completed successfully and most office staff did not notice any change. Other OSS users include the government of the city of Salzburg, the Dutch public works department, and a Slovakian school that had computers but not the funds to purchase Microsoft licenses (IDABC 2005). The European Union recently approved its first initiative to support research and development of open source software in the international arena. The 660,000 euro grant will be shared with countries such as Argentina, China, India, and South Africa, and will be used to study the regional differences in software development, the attitudes of public and private sector officials to OSS, and its affect on skills development and employment (Kingstone 2005).

OSS is also becoming increasingly popular in the private sector. In Japan, for example, over twenty percent of the nation's companies use OSS operating systems, and twenty-two percent are considering or have plans to adopt OSS operating systems. The Industrial Bank of China uses OSS in all of its operations and 20,000 branches (Adelstein 2005). In Malaysia, the government is attempting to spur private sector growth in the software sector with the OSS-Platform Investment Program. This $36 million USD fund has the goal of encouraging the development of forty OSS companies (Adelstein 2005).

Several developing countries, most notably Brazil, have also been on the forefront of OSS development. Many Brazilian ministries and enterprises are switching to open source software alternatives such as Linux. Cost savings are the primary motivation, as the government estimates that it will save nearly $120 million per year in licensing fees by switching to OSS (Kingstone 2005). President Luiz Inacio Lula da Silva is considering a proposal that would mandate the use of OSS for all federal agencies.

The open source initiative is part of a broader movement in Brazil to bridge the digital divide and make technology accessible for the less privileged. For example, a program teaches children in Brazilian *favelas* to use computers by building labs in their neighborhoods. They use donated computers and Linux operating systems, primarily out of economic necessity. However, OSS also allows customization and means that the systems are better suited to local needs (Kingstone 2005). Brazil has also instituted heavy export fines on technology products, forcing software companies to build local plants and hire local workers. Government officials are also spreading this message internationally. In preparation for a UN summit on information technology to be held in November, Brazilian diplomats are working on building support for a declaration that would stress the advantages of OSS (Kingstone 2005).

2.2 Jordan's Experience with OSS

As users of OSS often obtain software for free and do not register or pay license fees, it can be difficult to track their numbers. The Middle East region has not seen as much movement toward OSS as in other areas. For example, no national or local Arab governments appear on the CSIS list of open source policies. Additionally, the number of Jordanian firms providing OSS development and support is still small. However, there have been notable changes since int@j held their first seminar on OSS.

With support from the Ministry of Information and Communication Technology and the University of Jordan, int@j hosted a conference on OSS in December 2002. Billed as an "awareness-building" workshop, it served primarily to introduce businesses, academia, and the public sector to OSS and to "expose the local market to the commercial opportunities of Open Source Software" (int@j 2002a). The schedule of events reflected a presumption that attendees were largely unfamiliar with the topic. For example, Dr. Khalid Al-Ghonaim, chairman of the Saudi Computer Society, and CEO of Al-Elm Information Security, explained in his presentation the difference between closed and open source software, noted the benefits of OSS, and introduced Linux. Peter Gallagher of Development Infostructure described his company's use of open source in its business model and the U.S. Government's choice to use several OSS products, and Dr. Barbara Held from Germany's Ministry of the Interior explained the government's IT strategy and reasons for switching to OSS.

While there were presenters from two Jordanian firms with OSS experience, eStarta and STS, during the 2002 seminar, this year's event demonstrated the growth of the open source field in the region. For the 2005 seminar, the majority of speakers represented companies or organizations working in the Middle East. And, as the following section details, the seminar approached OSS in more depth and with more specific focus.

3. Open Source Software Seminar 2005

The seminar opened with welcoming comments from the Chairman of int@j, Ra'ed Bilbessi. In addition to reviewing the last seminar's content—introducing OSS, clearing up misunderstandings, and providing potential business models—Bilbessi introduced the

theme of this year's seminar: applying OSS to other sectors, such as academia and the public sector. HE Nadia Al-Saeed, Minister of Information and Communication Technology, reported on several OSS success stories since the last seminar, including the German Ministry of Interior's switch to OSS, the United Kingdom's use of OSS software for government procurements, and its use by the Korean civil service. In Jordan, an IBM Linux lab has been established at the University of Jordan, and the country's education initiative has adopted an OSS platform.

Over the next two days, the presentations that followed covered the economic development opportunities available to Jordan in OSS development. The seminar proceedings explored several themes, including business opportunities in OSS, the open source community and philosophy, and the challenges associated with OSS.

3.1 OSS Business Opportunities

Tom Adelstein, partner in Hiser + Adelstein a software consulting firm, gave a keynote address examined Jordan's capability to become a leader in the OSS field. Software development does not require many resources other than human input, and thus, any country can develop a specialization. Jordan has a large, well-educated youth population, which can be used to exploit the trend toward OSS. Jordan' population is its best natural resource. As Ammar Ibrahim, senior IT consultant for albawaba.com, noted, most businesses are more interested in the bottom line than they are in allegiance to any particular software brand. As such, the primary reason that firms give for switching to OSS is to save money on software licenses. Additionally, the hardware needed to run OS applications is less expensive. As security also translates into money spent, the increased level of security for Linux is another reason that firms use OSS. Although it's difficult to compile accurate data on software security (United Nations Conference on Trade and Development 2003, 102), it was noted that over ninety percent of Linux systems have never been infected with a virus. The owner of an OSS development company in Jordan, Kefah Issa, detailed the opportunities for profitable use and promotion of OSS. He has found that many firms are willing to consider OSS as they gain freedom from license tracking and are not locked into using a particular vendor. OSS development companies essentially split the cost of software development with those who have worked on earlier versions and with members of OSS community who provide assistance with problems.

James Dalziel, Director of the Macquarie e-Learning Center of Excellence in Sydney, described business opportunities in the academic arena. He demonstrated his center's new open source educational software, LAMS (Learning Management Systems), described the decision to make software open source and the marketing efforts behind it. Dalziel explained that developing OSS does not require large expenditures on marketing, as word-of-mouth about a free product spreads quickly. However, a significant input of energy and/or funding is necessary to create a viable OSS product. In addition to developing software, a number of other opportunities exist in "first generation" and "second generation" business models for open source. The first generation model involves providing technical support and installation services as well as custom software development. The second generation model may include provision of packaged technical

support, 'dual licensing,' or other unique offerings, such as certification in OS programming.

Presenters also covered the technical tools available to OSS developers. Basher Kilani, manager of IBM Enterprise in the Middle East, described Linux as reliable, popular, community-owned, flexible, and cutting-edge software. It can sit across many operating platforms, which translates into a reduction in development and maintenance costs. Linux has been utilized successfully in several public and private enterprises in the Middle East. The Egyptian Ministry of Tourism's "Eternal Egypt" software program was developed in OSS and runs in the Bibliotec Alexandrine, on the web, and in the Cairo Museum. The Standard Charter Bank in the Middle East also operates with OSS. The PC penetration rate in the region is still only 2%, and Kilani suggested that perhaps this is related to the high cost of popular PC operating systems. As such, there is a need to make software more affordable and accessible, and the Middle East, and particularly Jordan, has the opportunity to build an industry around this need. In addition to Linux, there are a wide variety of OSS options for every application, from operating systems to web browsers to database and content management systems, as Mohamed Sameer, the co-founder of Egyptian Linux User's Group, described in his presentation.

3.2 The Open Source Philosophy and Community

Several speakers noted that open source software development provides more than a product or service; the developers have formed a global community. Kefah Issa explained that OSS fosters a collaborative and humanitarian philosophy, as all are welcome to participate, contribute and benefit from its development.

"The key elements of the open-source process, as an ideal type, are voluntary participation and voluntary selection of tasks" (United Nations Conference on Trade and Development 2003, 98). How then are talented developers persuaded to work on open source products when labor is often is not compensated, much less organized? Individuals and firms are persuaded to enter OSS development for a number of reasons, as the seminar speakers and studies have shown. Even for propriety software, the cost of licenses is only a portion of the total cost of ownership. Profit can also be made from installation, maintenance and management. OSS developers operating independently may also be persuaded by career motivations or ego gratification, as programmers can gain recognition within the open source community (United Nations Conference on Trade and Development 2003, 106-108).

However, developers may also be motivated simply by goodwill and an interest in sharing their work. At int@j's seminar speaker Ethan Zuckerman, research fellow at the Harvard University School of Law, described an interesting project involving digital collaboration. Wikipedia, an online encyclopedia, has twice as much content as Encyclopedia Britannica and Encarta. The project involves open source software, as well as open content; users are able to edit the content of any entry and view the history of changes. While one may speculate that such freedom could lead to chaos, this has not occurred. As Zuckerman explained, studies of Wikipedia have shown that destructive

changes to entries are generally undone within forty-five minutes. Although writers are not paid for their contributions, it seems that certain people develop more of an interest in the project than others; over 70 percent of the work on Wikipedia was completed by two percent of contributors. The patterns in which labor has developed and problems have been solved for the Wikipedia project are analogous to OSS development. Although labor is not organized, progress is generally made and errors corrected due to the watchful eye of certain contributors, in the same fashion as OSS is written and improved by the open source community of developers.

3.3 Development Opportunities for Jordan and the region

In addition to the general business opportunities available through OSS development, the presenters discussed openings particular to the Arab world. As Tom Adelstein in his discussion on world trends in OSS noted, no one country in the region has solidly taken the lead in OSS use or promotion. While Egypt and Syria arguably have more experience with OSS than other countries in the region, the speakers seemed to agree that there were niches available for Jordan to fill.

As several presenters noted, OSS may be especially useful in "Arabizing" software. Mohamed Sameer, co-founder of the Arabeyes project, related that progress has been made in the Arabization of software since the last OSS seminar. However, much work remains to make software available for an Arab audience. Mr. Sameer outlined several of the projects Arabeyes has successfully completed in recent years, including the development of an Arabic language font and Arabic-appropriate bidi (line-spacing, especially in relation to English script). Yet, a spell-checking function, optical character recognition and voice recognition capabilities have not been developed for the Arabic language. These products offer a unique opportunity for OSS proponents in the region. Presenter Basher Kilani noted that while a comprehensive plan for a move toward OSS may be lacking in Jordan, there is an opportunity to "build an industry around a need."

3.4 Challenges in OSS development

The opportunities available in OSS development are not without potential challenges, and several speakers at the seminar addressed these. For those wishing to develop business around OSS, one may encounter negative perceptions around open source products. Kefah Issa described some of the complaints he has heard regarding OSS; some may claim that it has limited features, is of poor quality, and technical support is not available. While it may be true that OSS packages have fewer features, Mr. Issa contended that most proprietary software has many more features than the average person uses regularly. Does it not make more sense to pay less for software with the consistently-used features, and to add advanced ones as needed? There is also a perception that adopting OSS will mean that no technical support is available. In fact, any company or individual with OSS experience may be commissioned to add services or correct problems.

OSS has not caught on in Jordan or in the Middle East as rapidly as it has in other regions. Speakers and attendees at the seminar offered several perspectives on this

phenomenon. Basher Kilani suggested that the low level of computer usage in general is likely a factor, as well as the lack of a comprehensive national or regional strategy on developing OSS resources. Tom Adelstein offered that OS efforts are more likely to thrive in countries with governments that promote its use and proposed that the Government of Jordan should support and use OSS to a greater degree. Others suggested that a culture of innovation is lacking, and that while many young people are trained in IT, they do not have skills in OSS development or ingenuity to pursue it.

4. Conclusions and Recommendations

The speakers at int@j's seminar presented an optimistic outlook for the future of OSS in Jordan. The event featured speakers working on open source software and initiatives in Jordan and the region, and provided insight on economic opportunities available through OSS. The field has developed significantly since the last seminar in 2002, but there is still room for growth.

Viewpoints seemed to differ on whether government support is necessary for OSS development to succeed. Certain speakers presented the position that, in order for open source to take hold in Jordan, the government needed to promote its use. Other presentations argued that individuals and firms could develop and profit from OSS on their own initiative. All seemed to agree, however, that Jordanian students in the IT field would benefit from further training in OSS programming. Whether the Government of Jordan elects to promote OSS or not, more firms in the region and elsewhere are moving in that direction. In order for Jordan to make the most of economic opportunities in this arena, a skilled and educated workforce is the primary ingredient. One seminar attendee, proprietor of a software company in Jordan, stated that he receives hundreds of applications from recent college graduates. It seems that all of them have taken the same types of courses, and few of them have skills in open source programming.

To make Jordan competitive in the open source field, curriculum should be developed and introduced in Jordanian high schools and universities that exposes students to OSS software and programming. Outside of the formal education system, private firms or public institutions can develop and market OSS training and certification programs, which will create a more diverse and educated workforce while serving as a revenue streams for the training entities. The only necessity for success in OSS development is skilled human resources, and by investing in training and education for the workforce, Jordan can see economic development though this growing field.

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Appendix A
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